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WATER QUALITY SURVEY OF THE CONTENTNEA CREEK SUB-BASIN NEUSE RIVER, NORTH CAROLINA

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
CHARLOTTESVILLE, VIRGINIA

1969

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PB 260 351

U. S. DEPARTMENT OF THE INTERIOR

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CONTROL ADMINISTRATION

MIDDLE ATLANTIC REGION

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MARYLAND

DISTRICT OF COLUMBIA

VIRGINIA

NORTH CAROLINA

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Water quality in Contentnea Creek and major tributaries in North Carolina is defined, and thephysical, chemical, and biological characteristics of the streams are determined. The data is intended for use in determining the waste assimilative capacity of the streams, in developing an oxygen-sag mathematical model of the streams using existing computer programs, and in determining water quality conditions as related to public health aspects for water supply above the proposed Corps of Engineers' Buckhorn Reservoir.

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WATER QUALITY SURVEY

OF THE

CONTENTNEA CREEK SUB-BASIN

NEUSE RIVER, NORTH CAROLINA

1969

DATA REPORT NO. 2

Federal Water Pollution Control Administration
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia 22901

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I. PURPOSE

The purpose of the study was to define present water quality in Contentnea Creek and major tributaries and to determine physical, chemical, and biological characteristics of the stream. The data collected will be used as follows:

1. To determine the waste assimilative capacity of Contentnea Creek and major tributaries.

2. To develop an oxygen-sag mathematical model of the streams utilizing existing computer programs.

3. To determine water quality conditions as related to public health aspects for water supply above the proposed Corps of Engineers Buckhorn Reservoir.

A technical report will be prepared following detailed evaluation of the Survey data. The report will be submitted to the Office of Planning and Evaluation for use in determining the need for flow augmentation storage in the proposed Buckhorn Reservoir.

II. SCOPE

Stream sampling surveys were conducted during August and October 1969, to determine water quality conditions during critical low flow periods. The August survey involved sampling the Upper Contentnea Creek Basin to determine if the water quality was satisfactory for public water supply use. Sampling stations were selected below the towns of Zebulon, Bailey and Middlesex, North Carolina and also below the Wiggins Mill water supply reservoir at Wilson, North Carolina. Samples taken at these four sites were analyzed for the following parameters:

1. Heavy metals
2. Nutrients
3. Pesticides
4. Total and fecal bacteria

During the October survey a total of 26 stations were sampled on the following streams. (See Figure 2).

Stream Name	No. of Stations
Contentnea Creek	7
Little Contentnea Creek	5
Black Creek	5
Hominy Swamp	4
Toisnot Swamp	3
Whiteoak Swamp	1
Shepard Run	1

These stations, located between Wilson and Grifton, N. C. were sampled for dissolved oxygen, biochemical oxygen demand, pH and temperature. Sampling was scheduled at different times at each station to take into account the effects of normal diurnal changes in water quality. A study was also made to determine time of travel between each of the sample stations. In addition, samples of benthic organisms were taken to determine the biological response to existing water quality conditions. Stream discharge measurements and rating tables were prepared by the U. S. Geological Survey for each station.

III. PROCEDURES

The August bacterial sampling survey was operated from a mobile field laboratory based at the Burlington, N. C. waste treatment plant. Water samples taken for other parameters such as nutrients, heavy metals and pesticides were shipped to the NFIC laboratory in Cincinnati, Ohio after suitable preservation. The October samples were analyzed in a mobile field laboratory set up at the Wilson, N. C. water treatment plant.

The date and place of analysis of the various parameters are given in the table below:

Date Sampled	Parameter	Where Analyzed
August & October	Temperature	Field
August	Bacteria	Field laboratory, Burlington
August	Heavy metals	NFIC lab, Cincinnati
August	TOC	NFIC lab, Cincinnati
August	Nutrients	NFIC lab, Cincinnati
August	Pesticides	NFIC lab, Cincinnati
October	pH	Field laboratory, Wilson
October	Dissolved oxygen	Field laboratory, Wilson
October	Dissolved oxygen	Field laboratory, Wilson
October	BOD: short & long term	Field laboratory, Wilson

All laboratory analyses were conducted in accordance with the procedures described in the 12th edition of standard method and in accordance with the Analytical Quality Control program.

IV. STATION DESCRIPTION
Chemical and Biological Stations
Contentnea Creek Basin
North Carolina

Station Number	Stream Name	River Mile	Location
80	Little Creek	0.8	Little Creek at NC 39 near Zebulon, N. C.
82	Wilder (Haw) Branch	1.3	Wilder (Haw) Branch at SR 1105 (Nash County) near Bailey, N.C.
82 A	Beaverdam Branch	1.2	Beaverdam Branch at SR 1111 (Nash County) near Middlesex, N.C.
85	Hominy Swamp Canal	6.8	Hominy Swamp at SR 1321 (Wilson County) in Wilson, N.C.
86	Hominy Swamp Canal	5.9	Hominy Swamp at US 264 (Bus) in Wilson, N.C.
87	Hominy Swamp Canal	2.9	Hominy Swamp at SR 1606 (Wilson County) near Wilson, N. C.
87 A	Hominy Swamp Canal	2.4	Hominy Swamp at Wilson, N. C. new sanitary treatment plant of SR 1602 (Wilson County)
87 B	Contentnea Creek	63.6	Contentnea Creek at SR 1606 (Wilson County) above Hominy Swamp confluence near Wilson, N.C.
88	Contentnea Creek	60.6	Contentnea Creek at SR 1622 (Wilson County) below Hominy Swamp Canal confluence near Black Creek, N.C.
88 A	Contentnea Creek	67.3	Contentnea Creek at US 301 near Wilson, N.C.
95	Contentnea Creek	51.5	Contentnea Creek at NC 222 near Stantonsburg, N.C. and downstream from Black Creek
96	Contentnea Creek	48.2	Contentnea Creek at NC 58 near Stantonsburg, N.C.
99	Contentnea Creek	27.7	Contentnea Creek at US 258/13 at Snow Hill, N.C.

Station Description (Continued)

Station Number	Stream Name	River Mile	Location
102	Contentnea Creek	19.7	Contentnea Creek at NC 123 near Hookerton, N. C.
103	Contentnea Creek	12.7	Contentnea Creek at SR 1410 (Greene Sounty) near Grifton, N.C.
107	Little Contentnea Creek	17.0	Little Contentnea Creek at NC 121 at Farmville, N. C.
108	Little Contentnea Creek	14.7	Little Contentnea Creek at SR 1218 (Pitt County) near Farmville, N.C.
108 A	Little Contentnea Creek	8.5	Little Contentnea Creek at SR 1343 (Greene County) near Ballards Crossroads, N.C.
108 B	Little Contentnea Creek	2.4	Little Contentnea Creek at NC 102 at Scuffleton, N. C.
T1	Toisnot Swamp	9.0	Toisnot Swamp at US 264 near Wilson, N. C.
T3	Toisnot Swamp	5.6	Toisnot Swamp at SR 1542 (Wilson County) near Saratoga, N. C.
T4	Toisnot Swamp	2.5	Toisnot Swamp at NC 222 near Stantonsburg, N. C.
T2	White Oak Swamp	8.0	White Oak Swamp at US 264 near Saratoga, N. C.
100	Shepard Run Creek	0.4	Shepard Run Creek at NC 91 near Snow Hill, N. C.
	Additional Biological Stations		
89	Unnamed tributary to Black Creek	1.0	Unnamed tributary to Black Creek at SR 1653 near Lucama, N.C.
90	Black Creek	10.6	Black Creek at SR 1649 near Lucama, N.C.
91	Unnamed tributary to Black Creek	2.1	Unnamed tributary to Black Creek at SR 1645 near Lucama, N. C.

Additional Biological Stations (Continued)

Station Number	Stream Name	River Mile	Location
92	Unnamed tributary to Black Creek	1.0	Unnamed tributary to Black Creek at SR 1645 near Lucama N. C.
93	Black Creek	6.3	Black Creek at US117 near Black Creek
105	Langs Mill Run	4.2	Langs Mill Run at US 22 near Fountain, N. C.

V. SURVEY RESULTS

BACTERIOLOGY

Contentnea Creek Basin
North Carolina

Date	Temp °C	Total Coliform No. 100/ml	Fecal Coliform No. 100/ml
		STATION 80	
August 15, 1969		380,000	17,000
16		290,000	27,000
17	22.5	1,400,000	98,000
18	23	390,000	26,000
19	23.5	2,400,000	380,000
20	23.5	1,900,000	420,000
		STATION 82	
August 15, 1969		30,000	3,300
16	22	35,000	2,400
17	22.5	69,000	2,700
18	22.5	45,000	1,400
19	23	83,000	8,100
20	22.5	78,000	3,100
		STATION 82 A	
August 15, 1969		26,000	4,000
16		4,700	280
17	21.5	15,000	430
18	21.5	26,000	990
19	21.5	6,300	400
20	21.5	32,000	1,500
		STATION 88 A	
August 15, 1969		1,200	70
16		5,600	1,400
17	24.5	6,200	290
18	24	2,400	120
19	26	3,100	130
20	25	3,400	80

V. SURVEY RESULTS

CHEMICAL-BIOCHEMICAL

Contentnea Creek Basin
North Carolina

Date (1969)	Time	Flow cfs.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 lb/day	D.O. mg/l	Percent Saturation	Temp °C	pH
				Station 85					
Oct. 7, 1969	0620	0.34	56.0	78.0	143	0	0	17	7.0
8	0820	0.06	49.5	72.0	23	0	0	17	7.2
9	1000	0.06	62.0	85.0	27	0	0	17	7.0
10	1200	0.01	97.0	146.0	8	0	0	16	7.4
11	1400	0.01	81.0	135.0	7	0	0	16	7.6
12	2000	0.01	96.7	146.7	8	0	0	17	8.0
13	2205	0.01	193.0	247.0	13	0	0	18	7.1
14	2400	0.01	160.0	235.0	13	0	0	18	8.0
15	1600	0.01	142.0	207.0	11	0	0	15	8.0
16	0405	0.01	160.0	203.0	11	0	0	14	7.8
				Station 86					
Oct. 7	0700	1.9	0.9	2.2	22	7.70	77	16	6.9
8	0840	0.9	0.8	1.7	8	7.60	78	17	6.8
9	1010	1.4	0.9	2.0	15	7.50	77	17	6.6
10	1215	0.9	0.8	1.8	9	8.20	86	18	7.0
11	1415	0.6	0.6	1.7	5	8.10	88	20	6.9
12	2035	0.5	1.1	2.1	6	6.95	71	17	7.2
13	2225	0.3	0.8	1.6	3	6.60	71	19	6.6
15	0020	0.4	0.6	1.4	3	6.60	67	18	6.8
15	1615	0.3	0.8	1.7	3	8.90	91	17	7.0
16	0420	0.1	0.8	1.6	1	7.50	75	15	6.8
				Station 87					
Oct. 7	0815	7.4	7.3	13.2	526	3.0	31	18	6.7
8	0910	4.5	5.6	9.4	228	2.7	28	18	6.8
9	1045	4.0	4.6	7.2	155	1.7	18	19	6.6
10	1635	3.2	4.0	9.2	158	1.6	18	21	7.0
11	1445	3.2	6.0	12.0	207	0.9	10	20	7.0
12	2115	2.0	3.2	11.0	118	1.4	15	20	7.0
13	2250	2.4	19.0	24.5	316	0	0	21	6.7
15	0035	0.9	19.5	36.5	177	0	0	20	6.8
15	1635	2.4	19.0	40.0	516	0	0	18	6.8
16	0445	1.8	18.0	32.0	310	0	0	16	6.8
				Station 87A					
Oct. 7	1235	22 est.	16.0	28.2	-	3.5	39	21	6.9
8	1205	19 est.	22.2	-	-	3.1	34	21	7.0
9	1400	18 est.	18.0	32.6	-	2.5	29	23	6.9
10	1600	16 est.	34.5	62.0	-	2.4	27	22	7.2
11	1730	15 est.	13.0	33.0	-	2.2	24	21	7.3

V. SURVEY RESULTS
CHEMICAL-BIOCHEMICAL

Contentnea Creek Basin
North Carolina

Date (1969)	Time	Flow cfs.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 lb/day	D.O. mg/l	Percent Saturation	Temp °C	pH
Oct.				Station 87B					
7	0900	240	0.7	1.7	2195	7.10	73	17	6.1
8	0925	160	0.7	1.3	1119	7.20	75	18	6.0
9	1055	120	0.7	1.5	968	6.70	72	19	6.1
10	1250	105	0.4	0.9	508	7.40	79	19	6.2
11	1500	92	0.4	1.3	643	7.10	77	20	6.4
12	2135	86	0.7	1.8	-	7.05	77	20	6.4
13	2305	80	0.5	1.3	560	7.00	75	19	6.2
15	0050	61	0.7	1.1	361	6.85	73	19	6.2
15	1645	56	0.7	1.5	452	7.10	74	18	6.2
16	0500	45	0.5	1.2	291	7.30	75	17	6.2
Oct.				Station 88					
7	0915	310	0.6	3.1	5170	5.60	59	18	6.1
8	0940	205	1.1	2.4	2647	5.60	59	18	6.2
9	1110	145	1.5	3.0	2340	5.00	55	20	6.2
10	1305	120	2.1	3.8	2453	4.80	51	19	6.4
11	1515	105	1.4	2.7	1525	4.80	51	19	6.6
12	2155	94	1.1	2.9	1466	4.90	52	19	6.6
13	2315	80	2.0	3.8	1636	4.30	46	19	6.4
15	0110	65	2.9	6.2	2168	3.00	33	20	6.4
15	1700	70	2.1	4.1	1544	3.90	41	18	6.4
16	0520	56	2.8	5.1	1536	3.85	40	17	6.4
Oct.				Station 95					
7	0945	550	1.0	2.1	6214	5.50	58	18	5.9
8	1000	450	0.9	1.8	4358	5.10	53	18	5.9
9	1130	345	1.0	1.8	3341	4.90	52	19	5.9
10	1330	290	0.8	1.5	2340	4.90	52	19	6.2
11	1535	265	0.9	1.7	2424	4.70	50	19	6.4
12	2210	245	0.8	2.1	2768	4.80	50	18	6.4
13	2335	240	1.2	2.1	2712	4.80	51	19	6.0
15	0135	230	2.0	2.8	3465	4.50	48	19	6.2
15	1715	220	1.2	2.3	2722	4.05	42	18	6.2
16	0535	205	0.9	2.4	2647	3.85	40	17	6.4

V. SURVEY RESULTS
CHEMICAL-BIOCHEMICAL

Contentnea Creek Basin
North Carolina

Date (1969)	Time	Flow cfs.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 lb/day	D.O. mg/l	Percent Saturation	Temp °C	pH
Oct.				Station 96					
7	1005	960	0.8	1.7	8780	5.50	58	18	5.8
8	1015	750	1.0	1.8	7263	5.00	52	18	5.9
9	1220	480	0.9	1.7	4390	4.80	51	19	5.9
10	1425	310	0.9	1.8	3002	4.70	50	19	6.5
11	1550	240	0.8	1.9	2453	4.40	46	18	6.4
12	2230	180	1.1	2.1	2034	4.60	48	18	6.4
13	2350	165	1.2	2.3	2042	4.40	46	18	6.0
15	0155	120	1.0	1.8	1162	4.65	50	19	6.2
15	1725	115	1.0	2.0	1237	4.45	47	18	6.2
16	0550	90	1.2	2.2	1065	4.10	41	16	6.0
Oct.				Station 99					
7	0640	1550	0.8	1.6	13,342	5.50	60	20	5.6
8	0820	1650	0.6	1.4	12,428	5.60	59	18	5.7
9	1035	1650	0.8	1.3	11,540	5.30	57	19	5.7
10	1225	1550	0.7	1.2	10,007	5.00	53	19	5.5
11	1430	1170	0.5	1.2	7,553	5.25	56	19	6.2
12	2030	640	0.8	1.4	4,820	5.75	61	19	6.1
13	2230	445	0.7	1.2	2,873	6.30	67	19	6.0
15	0015	365	0.8	1.5	2,946	6.10	65	19	6.1
15	1620	315	0.5	1.2	2,034	6.30	67	19	6.0
16	0430	310	0.6	1.2	2,001	6.55	67	17	5.9
Oct.				Station 100					
8	0910	4.8	0.2	0.6	15	7.30	75	17	5.4
9	1050	4.8	0.6	0.7	18	7.10	74	18	5.8
10	1245	4.0	-	-	-	7.10	74	18	5.3
11	1445	4.0	0.3	0.6	13	7.05	74	18	5.8

V. SURVEY RESULTS
CHEMICAL - BIOCHEMICAL

Contentnea Creek Basin
North Carolina

Date (1969)	Time	Flow cfs.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 lb/day	D.O. mg/l	Percent Saturation	Temp °C	pH
Oct.				Station 102					
7	0735	969	0.9	2.2	11,512	5.90	63	19	5.9
8	0945	1140	0.6	1.3	8,003	5.90	63	19	5.7
9	1120	1220	0.7	1.3	8,564	5.70	61	19	5.6
10	1305	1150	0.8	1.5	9,315	5.70	61	19	5.7
11	1510	922	0.5	1.2	5,975	5.40	58	19	6.2
12	2055	590	0.7	1.4	4,460	5.60	59	18	6.2
13	2255	392	0.5	1.1	2,328	5.95	64	19	5.8
15	0035	303	0.6	0.8	1,309	6.15	66	19	6.1
15	1645	275	0.5	1.1	1,634	6.40	68	19	6.0
16	0450	255	0.8	1.1	1,515	6.50	67	18	5.9
Oct.				Station 103					
7	0805	1350	0.8	2.3	16,704	6.00	64	19	5.9
8	1000	1400	0.9	1.5	11,298	5.70	61	19	5.7
9	1150	1480	0.7	1.2	9,555	5.70	62	20	5.6
10	1325	1500	1.0	1.7	13,719	5.60	61	20	5.7
11	1530	1420	0.4	1.2	9,168	5.55	59	19	6.1
12	2115	1430	0.7	1.3	10,000	5.40	58	19	6.2
13	2310	1220	0.7	1.1	7,220	5.40	58	19	5.9
15	0055	310	0.8	1.2	2,001	6.15	66	20	6.0
15	1700	295	0.5	1.0	1,587	6.30	67	19	6.0
16	0510	235	0.4	1.1	1,391	6.55	69	18	6.0
Oct.				Station 107					
7	0945	59	0.3	1.1	349	6.70	70	18	5.6
8	1125	43	0.4	1.1	254	6.80	73	19	5.7
9	1300	36	0.6	1.1	213	6.60	72	20	5.6
10	1455	28	0.7	1.4	211	7.00	73	18	5.9
11	1645	18.5	0.1	0.7	70	7.15	76	18	6.3
12	2235	16.5	0.7	1.4	124	7.00	73	18	6.3
14	0020	16.0	1.0	2.0	172	6.35	68	19	6.0
15	0205	15.5	1.2	1.8	150	6.25	66	18	6.2
15	1810	10.0	0.9	1.5	81	6.50	68	17	6.0
16	0620	14.4	0.8	1.5	116	6.95	68	15	6.0

V. SURVEY RESULTS
CHEMICAL - BIOCHEMICAL

Contentnea Creek Basin
North Carolina

Date (1969)	Time	Flow cfs.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 lb/day	D.O. mg/l	Percent Saturation	Temp °C	pH
Oct.				Station 108					
7	0915	140	0.6	1.4	1054	6.20	65	18	5.8
8	1105	75	0.8	1.1	444	6.30	67	19	5.8
9	1245	50	1.7	1.3	350	6.30	69	20	5.8
10	1440	36	1.4	2.2	426	6.30	67	19	6.1
11	1635	23	0.8	1.7	210	6.00	64	18	6.6
12	2220	11.5	0.9	2.2	136	5.90	62	18	6.4
14	0010	9.8	1.4	2.4	126	5.05	54	18	6.2
15	0150	9.3	1.3	2.2	110	4.65	50	19	6.4
15	1755	8.2	1.0	2.4	106	5.00	52	18	6.2
16	0605	7.6	1.4	3.2	131	4.90	49	16	6.4
Oct.				Station 108A					
7	0845	195	0.8	2.1	2203	5.90	62	18	5.9
8	1035	145	0.4	0.9	702	6.10	64	18	6.0
9	1220	120	0.9	2.5	1614	6.00	64	19	6.0
10	1445	115	0.9	1.4	866	6.20	65	18	6.2
11	1600	69	0.4	1.2	445	6.15	65	18	6.6
12	2200	98	0.7	1.6	844	6.10	65	18	6.5
13	2345	27	0.6	1.3	189	5.50	59	19	6.4
15	0120	32	0.6	1.3	224	5.30	57	20	6.4
15	1730	28	0.8	1.8	271	5.40	57	18	6.4
16	0540	26	1.0	2.0	280	5.50	55	16	6.4
Oct.				Station 108B					
7	0825	330	0.5	1.3	2308	5.80	61	18	5.9
8	1015	275	0.7	1.2	1775	6.00	63	18	5.9
9	1205	280	0.9	1.4	2109	5.90	63	19	5.9
10	1345	255	1.0	1.3	1783	5.70	61	19	6.2
11	1545	250	0.3	0.9	1210	5.65	60	19	6.6
12	2130	200	0.9	1.4	1506	5.90	62	18	6.6
13	2320	135	0.5	1.1	799	5.50	58	18	6.4
15	0105	89	0.8	1.2	574	5.65	60	19	6.4
15	1710	56	0.7	1.3	392	5.80	62	18	6.5
16	0520	80	0.7	1.2	516	5.90	61	17	6.4

V. SURVEY RESULTS
CHEMICAL - BIOCHEMICAL
Contentnea Creek Basin
North Carolina

Date (1969) Oct.	Time	Flow cfs.	BOD_2 mg/l	BOD_5 mg/l	BOD_5 lb/day	D.O. mg/l	Percent Saturation	Temp °C	pH
				Station T1					
7	1130	73	1.0	2.3	903	6.70	60	17	5.8
8	1120	57	0.9	1.1	337	6.70	62	18	5.9
9	1310	52	0.4	0.9	252	6.70	63	19	5.8
10	1515	41	0.6	1.3	287	6.90	64	19	6.0
11	1650	39	0.7	1.2	252	7.20	67	19	6.2
12	2320	34	0.7	1.4	256	6.80	68	19	6.4
14	0030	26	1.4	2.5	350	6.60	66	19	6.1
15	0310	26	1.1	1.7	238	6.15	65	19	6.1
15	1815	24	0.9	1.6	206	7.20	63	17	6.1
16	0635	21	0.9	1.4	158	7.20	59	15	6.0
				Station T2					
7	1110	37	0.5	1.4	279	5.00	51	17	5.2
8	1105	16	0.2	1.0	86	5.30	56	18	5.2
9	1250	8.3	0.6	1.3	58	5.10	54	19	5.2
10	1500	4.0	0.6	1.1	24	5.50	58	18	5.4
11	1640	3.1	0.8	1.4	23	5.60	59	18	5.8
12	2305	1.9	0.6	1.4	14	5.35	55	17	5.2
14	0020	1.3	1.8	3.5	24	4.85	51	18	5.7
15	0245	1.9	0.8	1.5	15	4.50	47	18	5.6
15	1800	1.0	1.0	1.8	10	5.10	52	17	5.6
16	0620	1.0	0.6	1.4	8	4.95	49	15	5.4
				Station T3					
7	1155	160	0.6	1.5	1291	6.10	63	17	5.8
8	1140	96	0.5	1.0	516	6.40	67	18	5.7
9	1335	75	0.8	1.4	565	6.50	70	19	5.8
10	1535	55	0.6	1.3	385	6.70	69	18	5.9
11	1710	51	0.8	1.2	329	6.90	71	18	6.2
12	2340	34	0.9	1.5	274	6.80	70	18	6.0
13	0050	34	1.1	2.2	402	6.40	68	19	6.0
15	0325	30	2.7	4.4	710	4.50	48	19	6.0
15	1830	29	0.8	1.5	234	6.65	68	17	6.1
16	0650	21	1.0	1.6	181	7.30	72	15	5.9

V. SURVEY RESULTS
CHEMICAL - BIOCHEMICAL

Contentnea Creek Basin
North Carolina

Date (1969) Oct.	Time	Flow cfs.	BOD_2 mg/l	BOD5 mg/l	BOD_5 lb/day	D.O. mg/l	Percent Saturation	Temp °C	pH
				Station T4					
7	1050	270	0.4	1.2	1743	5.20	53	18	5.7
8	1045	135	0.7	1.2	872	6.20	64	18	5.7
9	1235	94	0.6	1.2	607	6.30	65	19	5.7
10	1440	68	0.7	1.1	402	6.60	69	18	5.8
11	1620	59	0.4	1.0	317	6.65	70	18	6.2
12	2245	49	0.5	1.2	316	6.65	70	18	6.0
13	2400	39	1.2	1.5	315	6.50	70	19	6.0
15	0225	36	0.7	1.2	232	6.40	71	21	6.0
15	1745	31	1.7	2.3	384	6.60	68	18	6.0
16	0600	26	0.7	1.2	168	6.90	69	16	5.8

V. SURVEY RESULTS
CHEMICAL - BIOCHEMICAL
Contentnea Creek Basin
North Carolina

(Heavy Metal Analyses)

Date (1969)	Cr mg/l	Cd mg/l	Pb mg/l	Ba mg/l	Se mg/l	Al mg/l
			Station 80			
August						
15	0.01	0.01	0.01	0.5	0.1	0.01
16	0.02	0.01	0.01	0.5	0.1	0.01
17	0.04	0.01	0.01	0.5	0.1	0.01
18	0.04	0.01	0.01	0.5	0.1	0.01
19	0.05	0.01	0.01	0.5	0.1	0.01
20	0.03	0.01	0.01	0.5	0.1	0.01
			Station 82			
August						
15	0.01	0.01	0.01	0.5	0.1	0.01
16	0.02	0.01	0.01	0.5	0.1	0.01
17	0.02	0.01	0.01	0.5	0.1	0.01
18	0.02	0.01	0.01	0.5	0.1	0.01
19	0.02	0.01	0.01	0.5	0.1	0.01
20	0.01	0.01	0.01	0.5	0.1	0.01
			Station 82A			
August						
15	0.01	0.01	0.01	0.5	0.1	0.01
16	0.01	0.01	0.01	0.5	0.1	0.01
17	0.01	0.01	0.01	0.5	0.1	0.01
18	0.01	0.01	0.01	0.5	0.1	0.01
19	0.01	0.01	0.01	0.5	0.1	0.01
20	0.01	0.01	0.01	0.5	0.1	0.01
			Station 88A			
August						
15	0.01	0.01	0.01	0.5	0.1	0.01
16	0.01	0.01	0.01	0.5	0.1	0.01
17	0.01	0.01	0.01	0.5	0.1	0.01
18	0.01	0.01	0.01	0.5	0.1	0.01
19	0.01	0.01	0.01	0.5	0.1	0.01
20	0.01	0.01	0.01	0.5	0.1	0.01

V. SURVEY RESULTS
TIME OF TRAVEL
Contentnea Creek Basin
North Carolina

Date (1969)	From Station	To Station	Distance (Miles	Time (Hours)	Q (cfs)
		Contentnea Creek			
	87B	88	5.1	e 47.6	e49
Oct. 23	88	95	10.7	59.3	54
Oct. 22	95	96	3.3	16.2	68
	96	99	20.5	e 98.3	e110
	99	102	8.0	e 39.3	e240
	102	103	7.0	e 34.4	e310
		Little Contentnea Creek			
	107	108	2.3	e 40.6	e10
	108	108A	6.2	e 88.5	e13
	108A	108B	6.1	e 73.3	e26
		Hominy Swamp			
	85	86	0.9	e 1.3	e0.1
	86	87	3.0	e 4.4	e0.3
	87	87A	0.5	e 0.7	e2.5
		Toisnot Swamp			
	T1	T3	3.4	e 6.2	e20
	T3	T4	3.1	e 5.8	e29

e estimated October 22 flows

V. SURVEY RESULTS BENTHIC ORGANISMS - CONTENTNEA CREEK BASIN

Station	87B	85	86	87	88	89	90	91	92	93	95	96	T-1	T-2	T-3	T-4	99	100	102	103	105	107	108	108A	108B
Pollution-Sensitive Organisms																									
Stoneflies																									
Atoperla sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	--	--	--	--	--	--	--
Mayflies																									
Ameletus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	--	--	--	--	--
Heptagenia sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	A	--	--	--	--	--	--	--
Hexagenia sp	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stenonema sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	C	--	--	A	--	--	--	--	--	--	--
Caddisflies																									
Chetopsyche sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	A	--	--	--	--	--	--	--	--	--	--
Hesperophylax sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--
Hydropsyche sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	A	--	--	--	--	--	--	--	--	--	--
Rhyacophila sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--
Fishflies																									
Chauliodes sp.	--	S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Shrimp																									
Palaemonetes sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S
Gill Breathing Snails																									
Lioplax sp.	--	--	--	--	--	--	C	--	--	C	--	--	--	--	--	--	--	--	--	--	--	S	--	--	--
Viviparus sp.	--	--	--	--	--	A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Intermediate Organisms																									
Crayfish																									
Cambarus sp.	--	--	C	--	--	--	A	--	A	A	--	--	--	S	S	S	--	--	--	--	--	C	--	--	--
Orconectes sp.	--	--	--	--	--	--	--	--	--	--	--	A	--	--	--	--	--	--	--	--	--	--	--	--	--
Scuds																									
Gammarus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	--	--	--	--	S	--	--	--	--	A
Hyalella sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--
Sow-bugs																									
Asellus sp.	--	--	--	--	--	--	--	--	--	--	C	--	--	C	S	--	--	--	--	--	--	--	--	--	S
Clams																									
Sphaerium sp.	--	--	--	--	A	S	S	--	S	--	C	--	C	--	S	S	--	--	--	--	--	C	S	C	--
Damselflies																									
Agrion sp.	--	--	--	--	S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Enallagma sp.	S	--	A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	A	--	--	--
Ischnura sp.	S	--	A	--	--	--	S	--	--	--	--	--	--	A	--	--	--	S	--	--	A	A	--	--	--
Dragonflies																									
Helocordulia sp.	--	--	C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	--
Libellula sp.	S	--	--	--	--	S	A	--	--	--	--	--	--	--	--	--	--	--	--	S	--	--	--	--	--
Macromia sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	--	--	--	--	--	A	--	--	
Nasiaeschna sp.	--	S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	A	--	--	--
Gomphus sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	--	--	--	--	--	--	--	--	--

Station	87B	85	86	87	88	89	90	91	92	93	95	96	T-1	T-2	T-3	T-4	99	100	102	103	105	107	108	108A	108B
Intermediate Organisms (Continued)																									
Flatworms																									
Dugesia sp.	--	--	--	--	--	--	--	--	--	--	C-	--	--	--	--	--	--	S	--	--	--	S	--	--	--
Midges																									
Metriocnemus sp.	S	--	--	--	A	--	--	--	A	--	A	S	--	--	--	--	--	--	--	--	--	S	S	--	S
Pentaneura sp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pollution Tolerant Organisms																									
Alderflies																									
Sialis sp.	--	--	--	--	--	S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	--	S	--
Mosquito																									
Culex sp.	--	A	--	--	--	--	C	--	--	--	--	--	--	S	--	--	--	--	--	--	--	--	--	--	--
Bloodworms																									
Chironomus sp.	--	C	S	--	--	--	--	A	--	--	--	A	S	--	--	S	--	--	--	--	--	--	--	--	--
Leeches																									
Erpobdella sp.	--	--	--	--	--	--	--	--	--	--	C	--	C	--	--	--	--	--	--	--	--	--	--	--	--
Glossiphonias sp.	--	--	--	--	--	--	--	--	--	--	--	--	C	S-	--	S	--	C	--	--	--	S	--	--	--
Air-Breathing Snails																									
Ferrissia sp.	--	--	--	--	--	--	--	--	--	--	C	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Helisoma sp.	--	--	--	--	S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Physa sp.	--	--	--	--	A	S	C	--	--	--	S	--	--	S	--	--	--	--	--	--	--	--	--	--	--
Bristleworms																									
Stylaria sp.	--	--	--	--	--	S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	S	--	--	--
Lumbriculidae sp.	--	--	--	--	--	S	--	--	S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sludgeworms																									
Limodrilus sp.	--	--	C	--	--	--	---	--	--	--	--	--	S	--	--	--	--	--	--	--	--	--	C	--	--
Tubifex sp.	--	--	--	--	--	--	--	--	--	--	--	--	S	--	--	S	--	--	S	--	--	--	C	--	--
Number of Genera (Kinds)	4	4	6	0	5	8	7	1	4	2	7	3	6	6	9	7	0	6	1	3	2	12	4	3	5

Key: A = Abundant
C = Common
S = Sparse

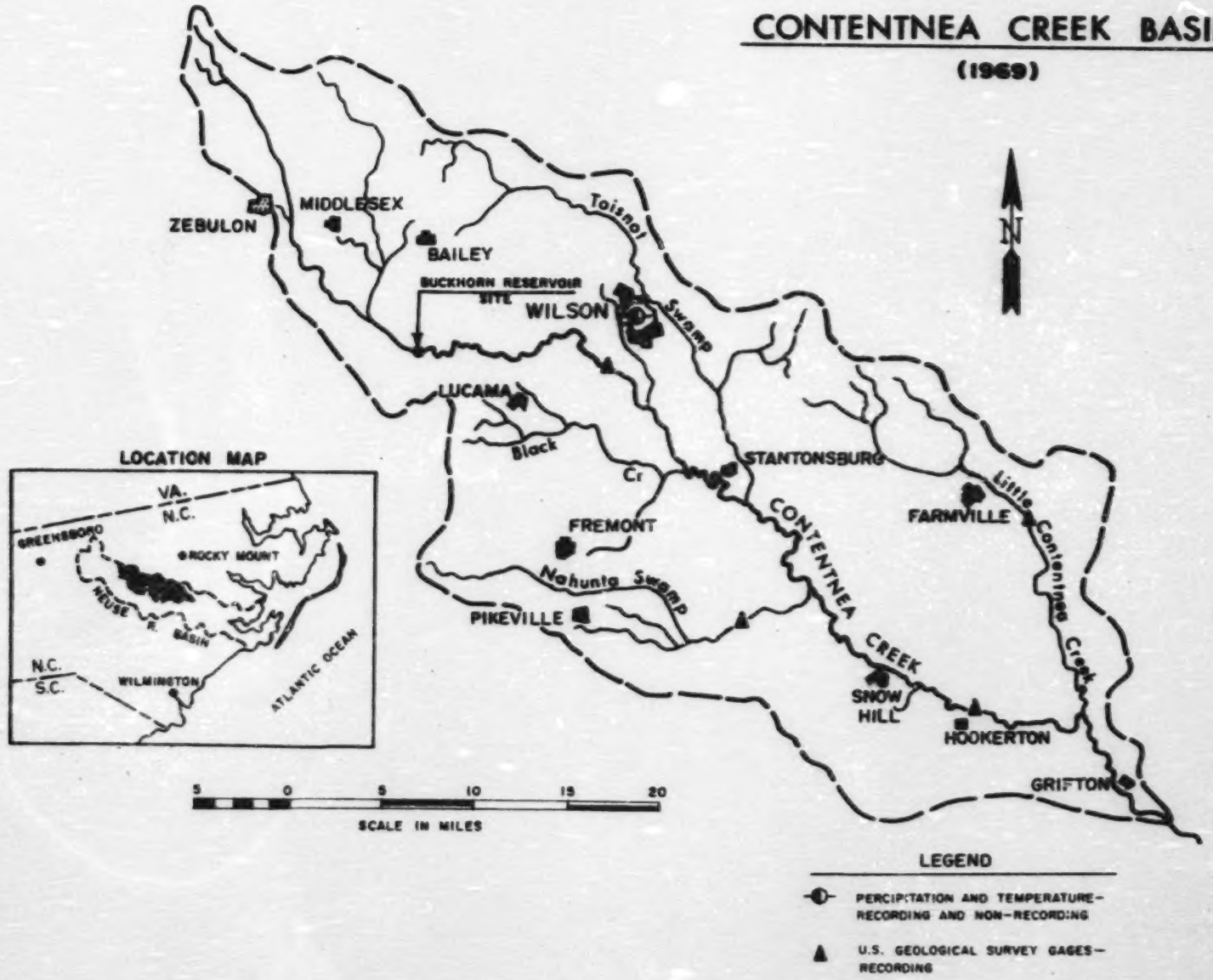

Figure 1— Stream and Rain Gage Locations

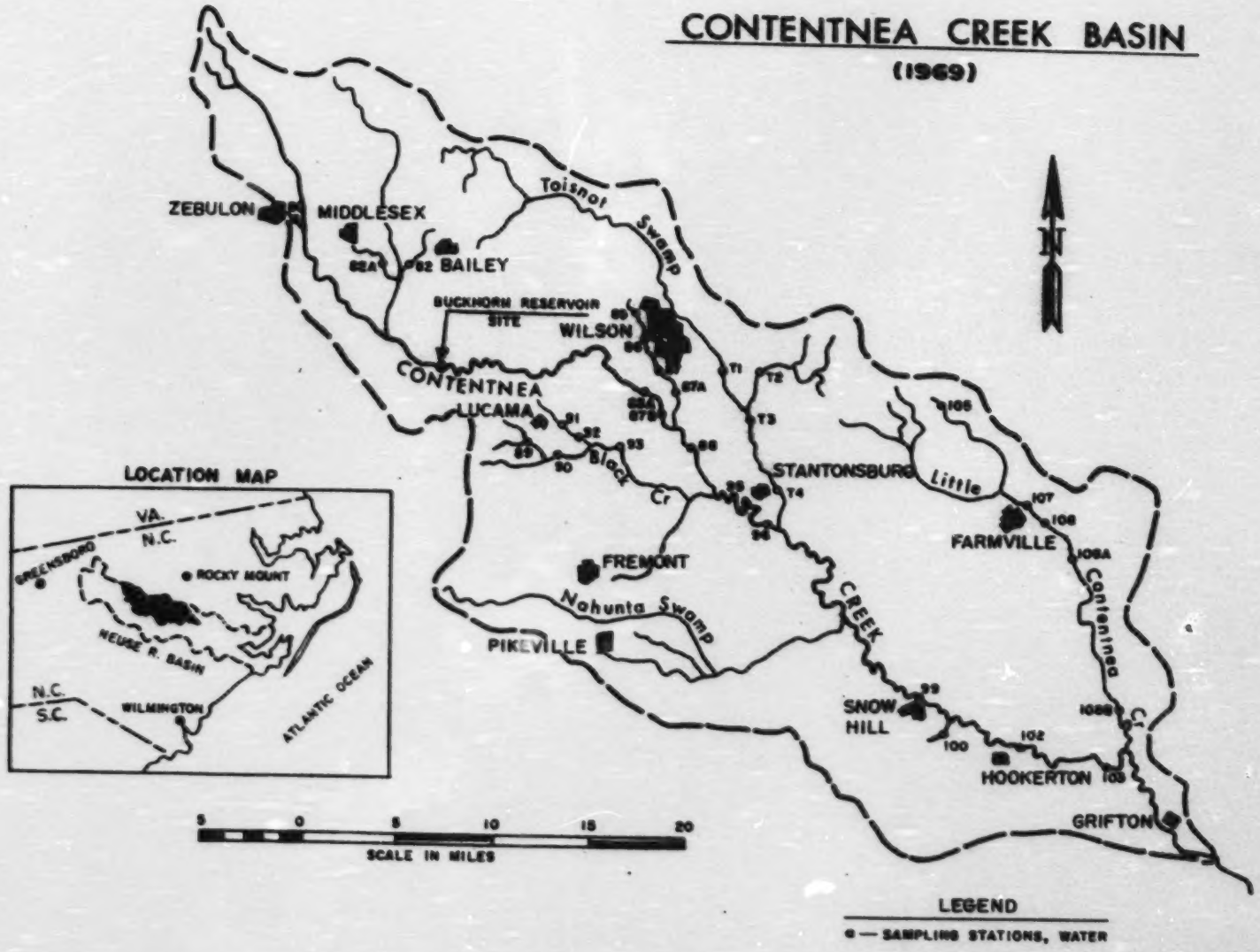

Figure 2— Sampling Stations

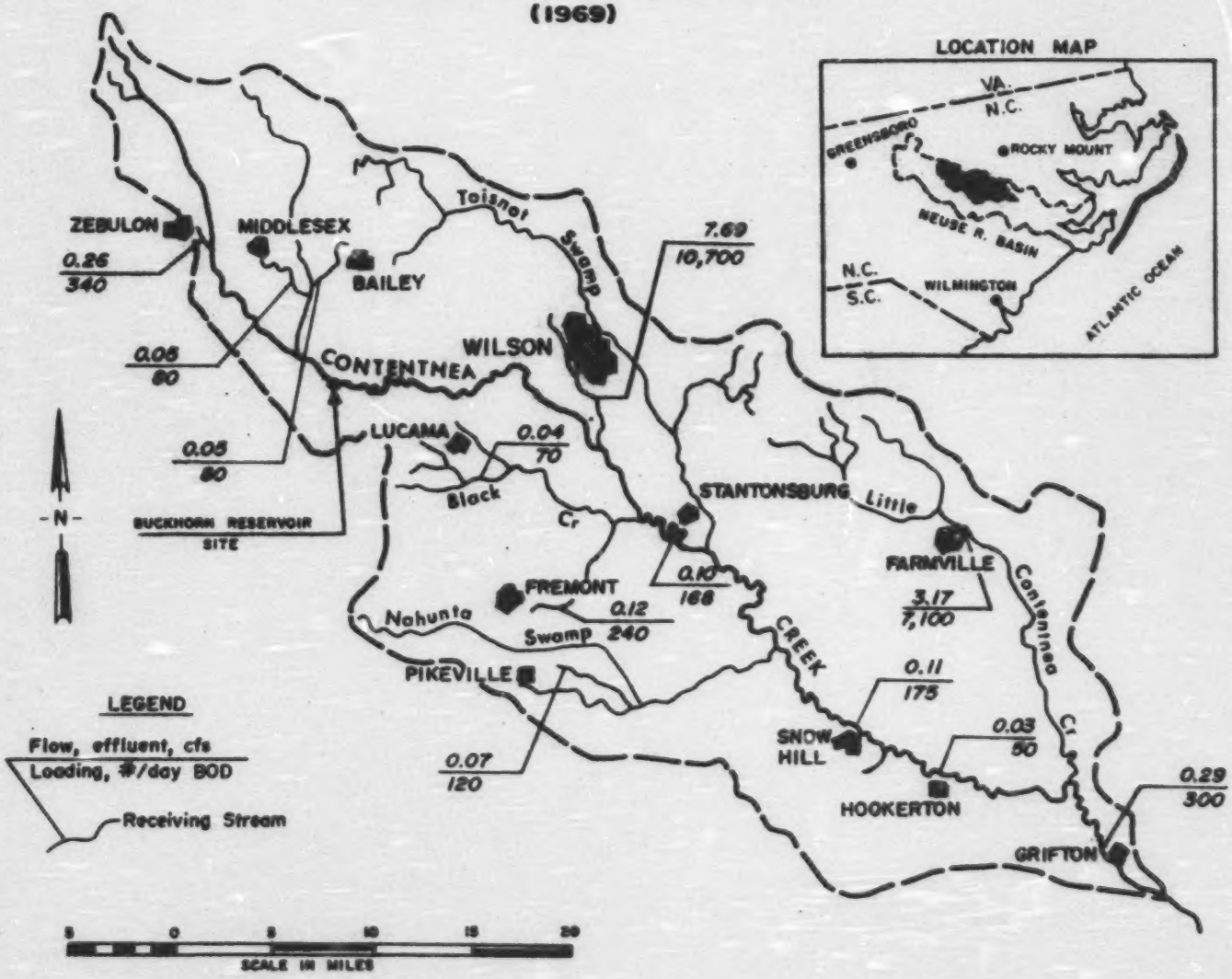

Figure 3— Effluent BODs Loadings

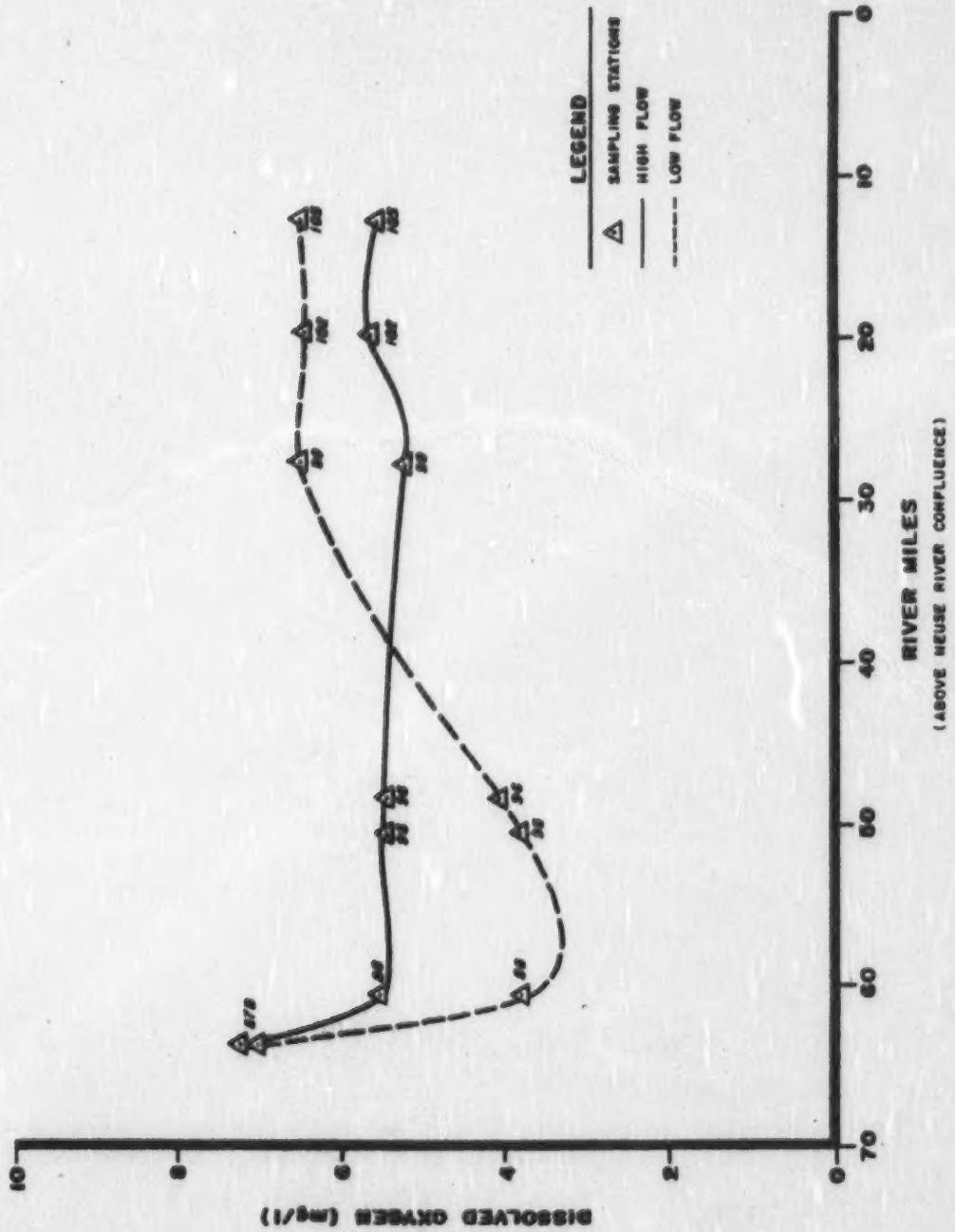

FIGURE 4—Dissolved Oxygen; Contentnea Creek between Wilson and Grifton, North Carolina.

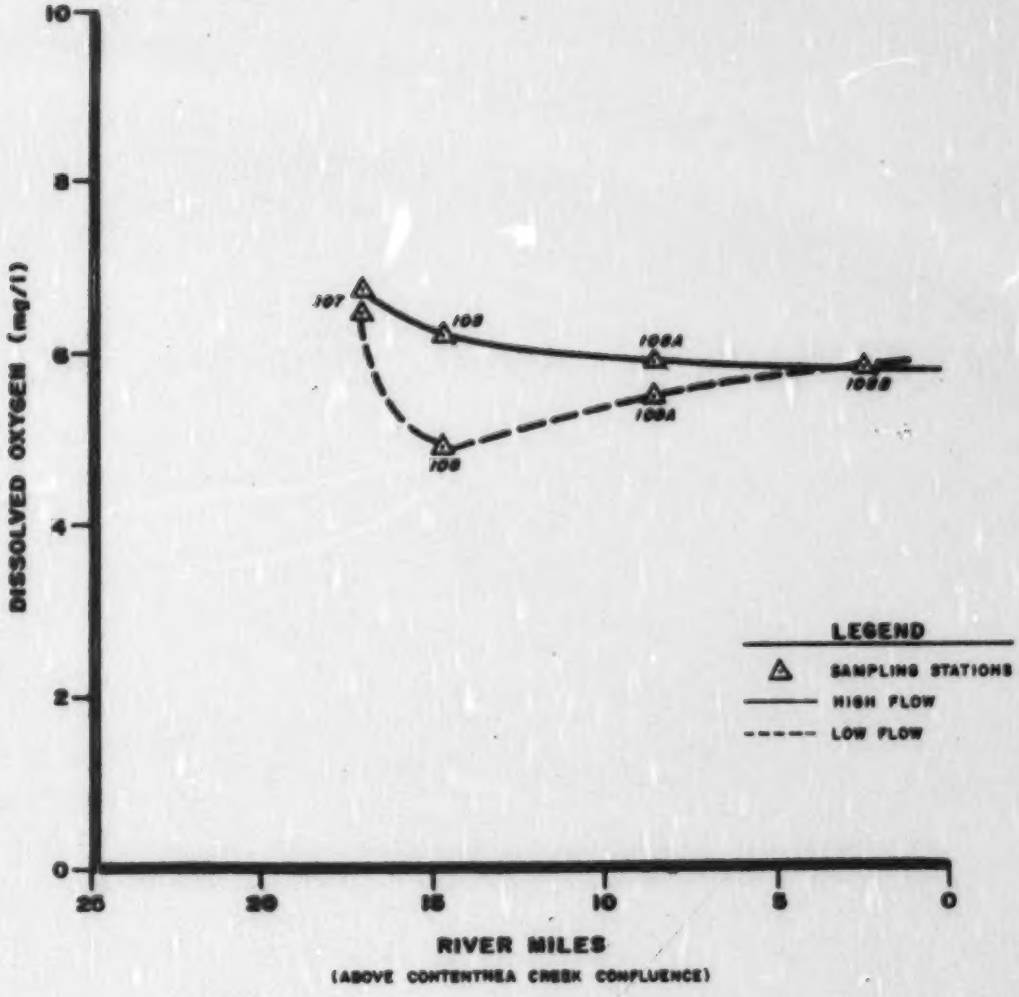

FIGURE 5—Dissolved Oxygen; Little Contentnea Creek between Farmville and Grifton, North Carolina.

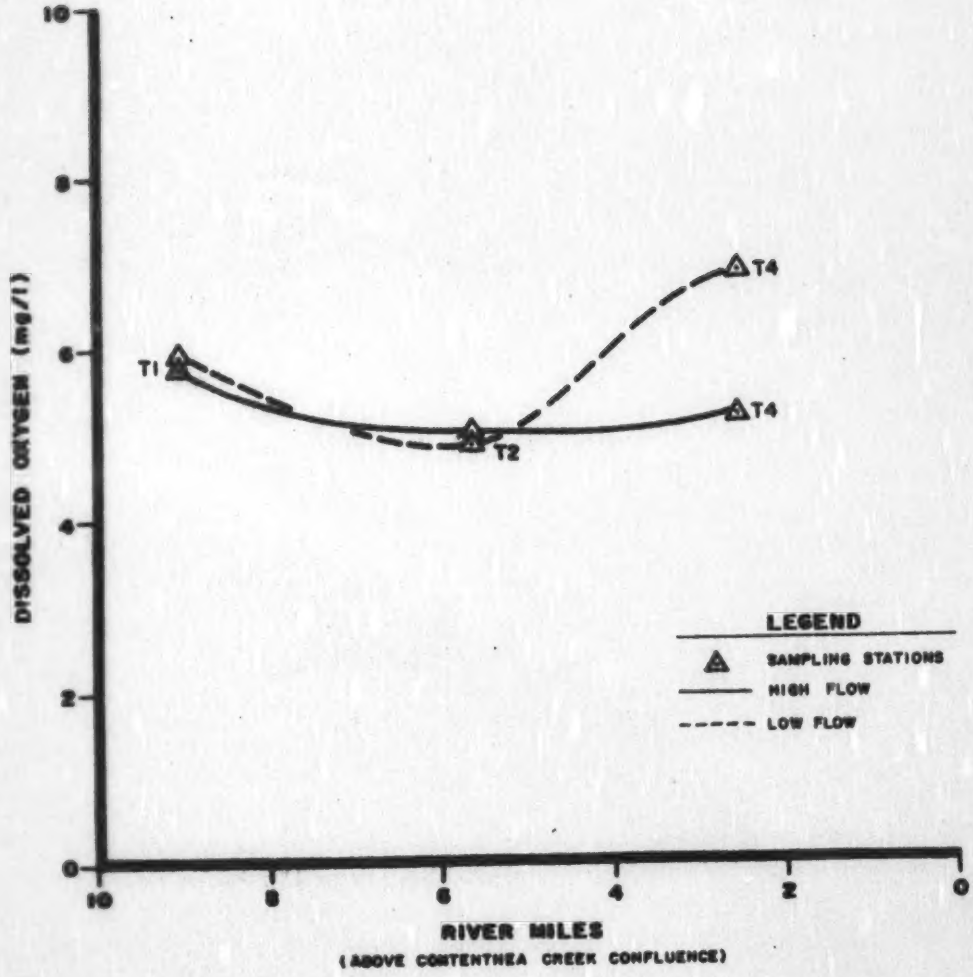

FIGURE 6—Dissolved Oxygen; Toisnot Swamp near Wilson, North Carolina.

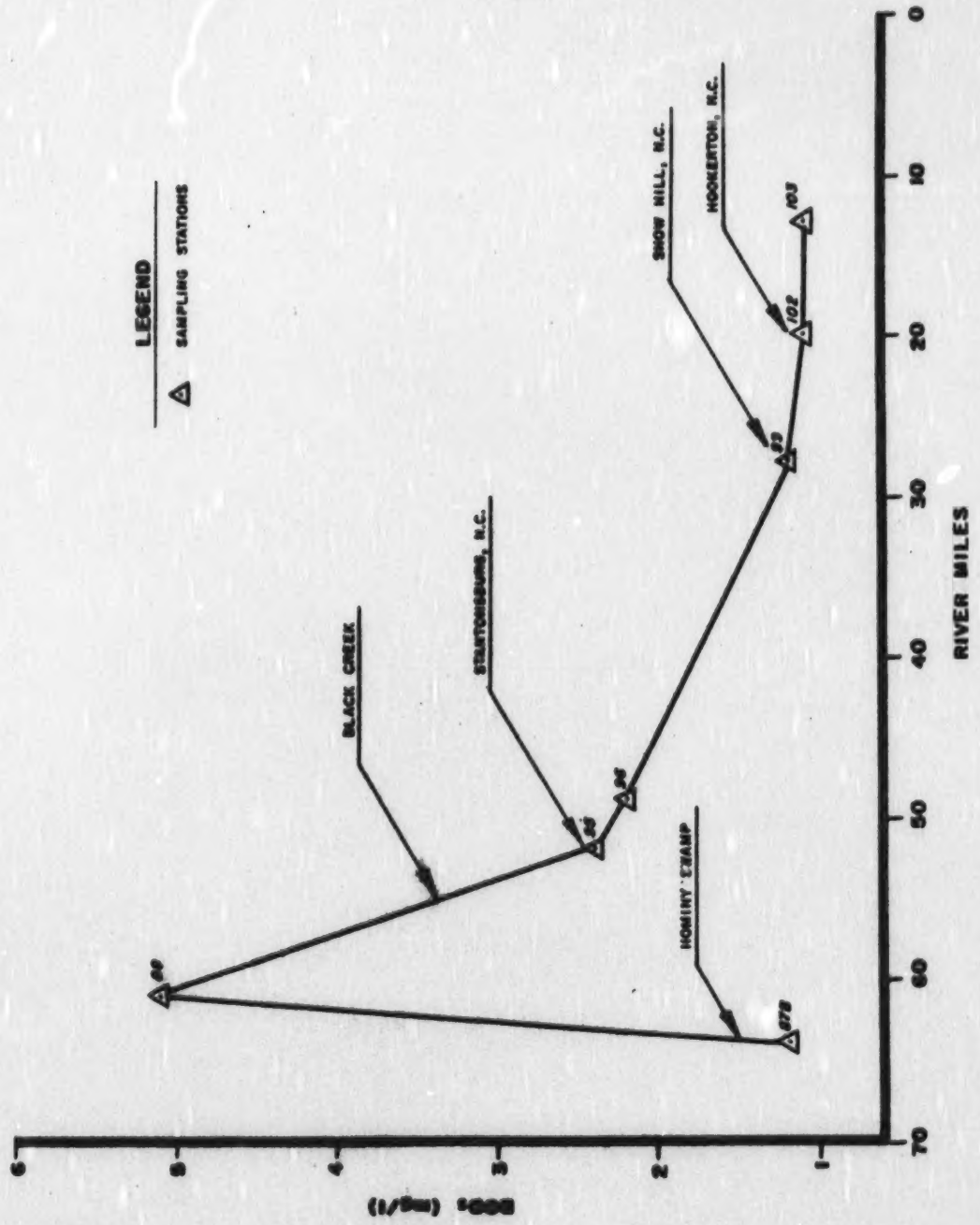

FIGURE 7—BODs vs River Mile in Contentnea Creek below Wilson, North Carolina.

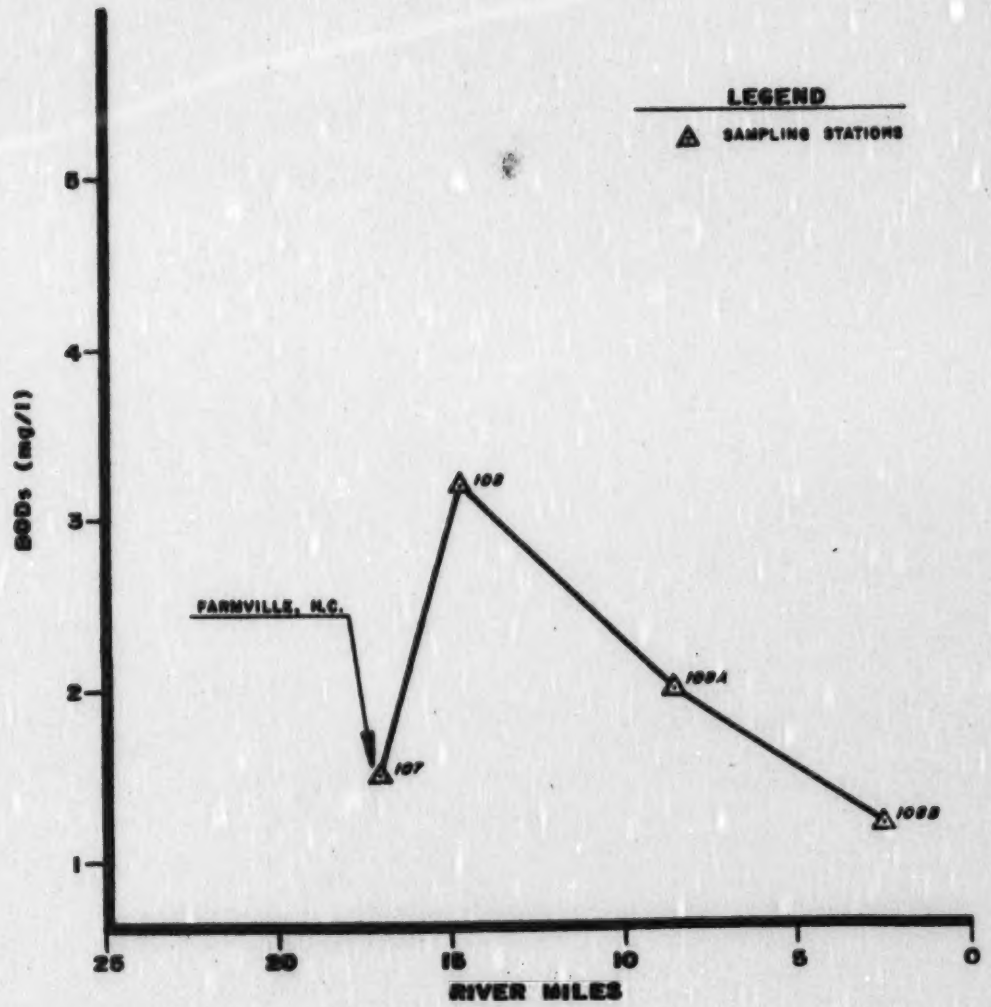

FIGURE 8 — BODs vs River Mile; Little Contentnea Creek below Farmville, North Carolina.

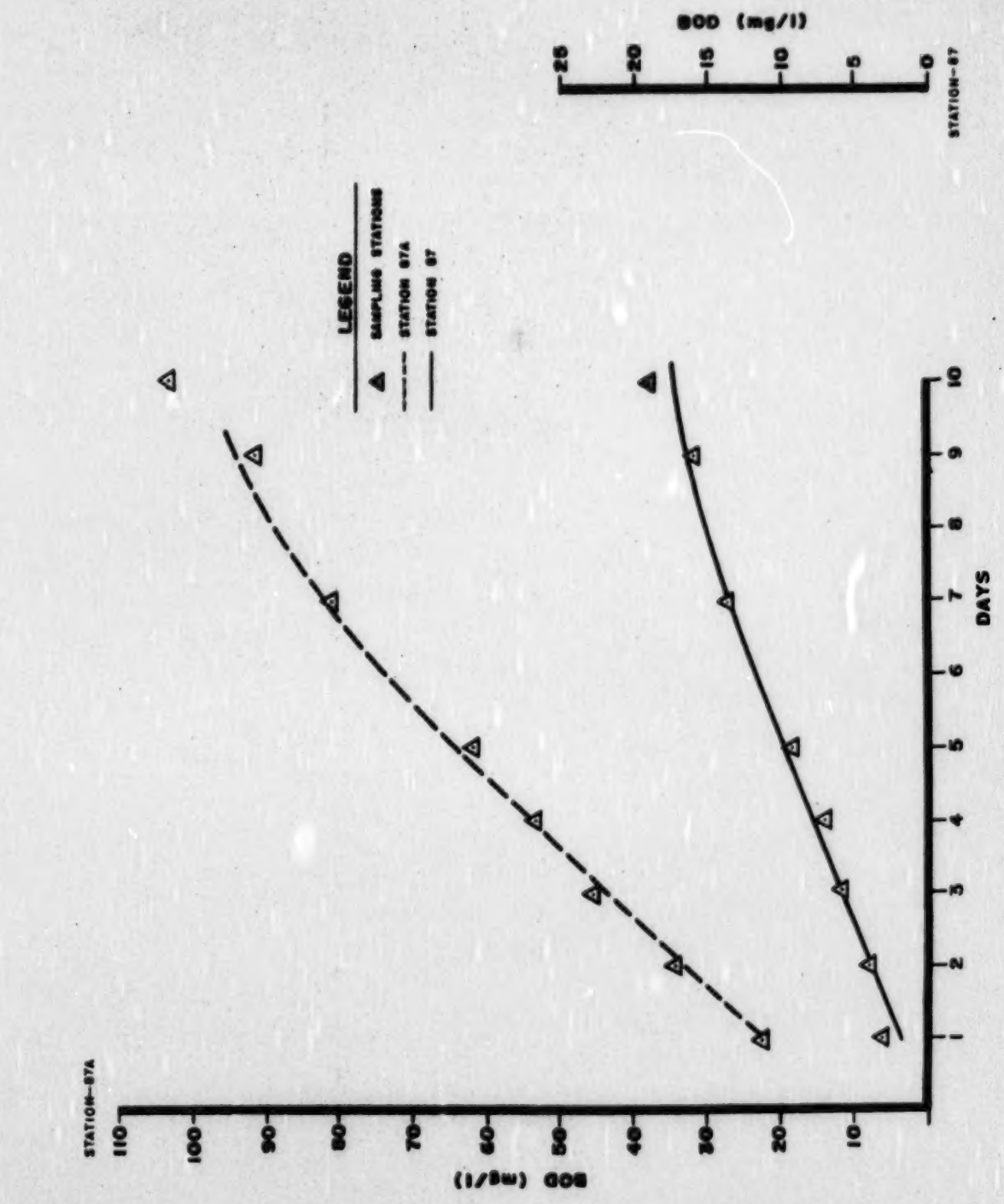

FIGURE 9—Long-term BOD Values in Hominy Swamp near Wilson, North Carolina.